

University of Delaware & the Delaware Nutrient Management Program

For over thirty years, the University of Delaware has conducted basic and applied research about nutrient management. Over the past ten years, UD has worked extensively with the Delaware Nutrient Management Commission and its partners to implement research based recommendations for Delaware agriculture. Faculty and staff conduct research and demonstration projects on nutrient management practices, provide technical recommendations to the Delaware Nutrient Management Commission, and provide certification training for nutrient generators, private and commercial handlers, and consultants.

Nutrient Management Research at UD falls generally into one of these categories:

- Field evaluations of improved nutrient management practices that can reduce nutrient loss and improve crop production efficiency; many have been conducted under “on-farm” conditions with cooperating farmers.
- Environmental “fate and transport” studies that examine the effect of nutrient management practices on soil and water quality and the safety of our food chain.
- Watershed scale projects that have a more holistic perspective, attempting to integrate socio-economic factors into the nutrient management planning process.
- Investigations of the basic chemical and physical reactions that control nutrient availability and losses to air and waters. These studies have had the goal of providing the fundamental understanding of nutrient interactions with soils and waters that must underlie any truly effective “best management practices.”

Nutrient Management Training, Education, and Certification through Cooperative Extension

The University of Delaware Cooperative Extension is responsible for offering the majority of initial certification and continuing education classes for the Nutrient Management Commission. Cooperative Extension began offering nutrient management certification classes in January of 2001. These courses address topics ranging from water quality

and nutrient cycling to the specifics of the Delaware Nutrient Management Act. Since 2001, more than 2,600 individuals have attended these certification classes. Certification requires continuing education. Since February 2004 there have been more than 260 different continuing education programs offering more than 700 credits.

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Poultry Nutrition Research and Implications for Phosphorous Reductions

Extensive research led by William Saylor, UD professor of animal and food sciences, has confirmed that Delaware chickens now digest more of the phosphorus, an essential nutrient, in their feed, thanks to the addition of a natural enzyme called phytase.

In traditional feeding programs, much of the in the corn and soybeans which comprise poultry feeds cannot be digested (used) by chickens, causing significant amounts of phosphorus to be excreted in litter.

The two most effective ways of reducing phosphorus in poultry litter are to 1) add the enzyme phytase to the diet which enables chickens to use more of the phosphorus in their feed and/or 2) reduce the amount of phosphorus fed to chickens to more closely meet their daily phosphorus requirements.

Phytase use has been embraced by the poultry industry on the Delmarva Peninsula and is included in the feeds of nearly, if not all broilers reared here.

Phosphorus additions to poultry feed, as a result of phytase use combined with feeding more closely to the broiler's phosphorus requirements, have been reduced by as much as 30%. These reductions amount to thousands of tons of phosphorus removed from broiler feeds with corresponding reductions of phosphorus in litter. In turn, there is a decrease in the amount of excess phosphorous available for losses to water if and when farmers apply poultry manure to croplands.

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Changes in Delaware's Nutrient Mass Balances

Researchers at the universities of Delaware, Maryland, and Florida have recently completed a detailed quantitative analysis of nutrient generation and use trends for Delaware for nitrogen (N) and phosphorous (P). The report "Nutrient Mass Balances for the State of Delaware 1996 to 2006" documents how efforts to improve agricultural nutrient management, particularly since the passage of the 1999 Delaware Nutrient Management Act, have affected statewide and county-level nutrient mass balances. A second objective of the report was to provide recommendations for research and extension programs to further

improve nutrient management and water quality.

The report notes that although nutrient surpluses have existed in Delaware and continue today, surpluses have decreased over the past 11 years. These trends suggest that nutrient management programs are reducing nutrient surpluses which should lead to lower N and P losses to air and water. However, continued efforts to improve nutrient management are essential, including the key areas of management strategies for high P soils, improving fertilizer N management, alternative uses for broiler litters, and irrigated crops.

In addition, the report recommends that a Nutrient Balance Index (NBI) be developed for Delaware. This annual index will track the impact of changing nutrient management practices on N and P surpluses. Reporting statewide and/or county NBIs can provide the Delaware Nutrient Management Commission with an annual measure of success and guide future investments in nutrient management planning.

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